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EXAMINER

ANDERSON, DENISE BROWN

ART UNIT	PAPER NUMBER
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2877

DATE MAILED: 02/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/784,763	Applicant(s) JASAPARA ET AL.	
	Examiner Denise B. Anderson	Art Unit 2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15, 18, 19 and 23 is/are rejected.
- 7) ☒ Claim(s) 16, 17 and 20-22 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 February 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

There was no information disclosure statement found in the application. Accordingly, an IDS is not being considered by the examiner.

Drawings

Figures 1,2 and 7 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the examiner does not accept the changes, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "42" has been used to designate both a pair of lenses and a beamsplitter arm in figure 3. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be

notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the 2nd spectrometer and polarizer must be shown or the feature(s) canceled from the claim(s). No new matter should be entered. The examiner notes that the polarizer and 2nd spectrometer are mentioned in the specification, but the exact structural relationships to the rest of the claimed features is not evident. Furthermore, in paragraph 0048 the applicant mentions the polarizer 55, but does not show this numeral reference in the drawings.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures.

Claim Objections

Intended Use

Claims 16 – 20 and 22 are objected to because of the following informalities:

As to claims 16 and 17, the recitation [“the method is used to measure the characteristic of eccentricity between the optical fiber and an outer coating layer”] has not been given patentable weight because the recitation occurs in the preamble.

As to claim 18, the recitation [“the method is used to measure the characteristic of the presence of unwanted sub-surface features”] has not been given patentable weight because the recitation occurs in the preamble.

As to claim 19, the recitation [“the method is used to measure the characteristic of layer thickness for multiple coating layers, including a primary coating layer and at least one additional coating layer,”] has not been given patentable weight because the recitation occurs in the preamble.

As to claim 20, the recitation [“the method is utilized with a microstructured optical fiber comprising a plurality of regularly arranged air holes,”] has not been given patentable weight because the recitation occurs in the preamble.

As to claim 22, the recitation [“the method is used to measure the characteristic of the effect of fiber tension during a draw process”] has not been given patentable weight because the recitation occurs in the preamble.

A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

Formatting

Claim 1 is objected to because of the following informalities: a transitional phrase such as "the arrangement comprising" should be included in line 2 so that the claim reads in an appropriate format. Appropriate correction is required.

Claim 20 is objected to because of the following informalities: a phrase such as "further comprises the step of" should be included in line 3 so that the claim reads in a format appropriate to a method claim. Appropriate correction is required.

Antecedent Basis

Claims 1, 3, 12, 14, 16, 19, and 22 are objected to because of the following informalities:

Claim 1 recites the limitations "the remaining input arm" in line 10 and "the measured object" in line 15. There is insufficient antecedent basis for these limitations in the claim. Appropriate correction is required.

Claim 3 recites the limitation "the measured polarization signals" in line 3. There is insufficient antecedent basis for this limitation in the claim. Appropriate correction is required.

Claim 12 recites the limitation "the output of the arrangement" in line 2. There is insufficient antecedent basis for this limitation in the claim. Furthermore, this language implies that the lensing arrangement is not part of the FDOCT arrangement as has already been claimed in claim 1. Appropriate correction is required.

Claim 14 recites the limitation "the fiber structure" in line 6 and "the interfaces" in line 7. There is insufficient antecedent basis for these limitations in the claim. Appropriate correction is required.

Claim 16 recites the limitation "the initial set of measurements" in line 5. There is insufficient antecedent basis for this limitation in the claim. Appropriate correction is required.

Claim 19 recites the limitations " the primary-coating/glass and secondary-coating/air interfaces, and (ii) secondarpcoating/air and secondary-coating/primary coating interfaces" in lines 5-7. There is insufficient antecedent basis for these limitations in the claim. The glass, secondary, and air interfaces have not been previously defined. Appropriate correction is required.

Claim 22 recites the limitations "the parallel polarization state" and "the perpendicular polarization state" in lines 6 and 8, respectively. There is insufficient antecedent basis for these limitations in the claim. Changing the word "the" to "a" would correct the problem. Appropriate correction is required

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 5, 9, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Venkatesh et al (USPN 5,633,712) and further in view of Knuttel (DE 102-07-186.1).

As to claim 1, Venkatesh et al discloses, in figure 1, a broadband lightwave source (low coherence source 12); an optical beamsplitter (coupler 16) with 2 input and output arms; one input arm coupled to the low coherence source 12; a lensing arrangement consisting of a single lens 27 connected to an output arm of coupler 16 for directing light to the optically transparent object (thin film 15); and an optical spectrum analyzer, which serves as a spectrometer and provides the Fourier transform of the frequency domain spectrum (column 3, lines 19-25 and column 5, lines 28-31) and the signal peaks are related to the material thickness (column 4, lines 22-34).

Venkatesh et al does not expressly disclose generating the fast Fourier transform. The examiner takes Official Notice of the fact that fast Fourier transforms are known to be used with spectral analysis. The fast Fourier transform is an algorithm to more efficiently perform the Fourier transform. It would have been obvious to one having ordinary skill in the art at the time of invention to incorporate the fast Fourier transform into the invention of Venkatesh et al, since its use was well known and it provides a more efficient method of analyzing the spectrum.

Several facts have been relied upon from the personal knowledge of the examiner about which the examiner took Official Notice. Applicant must seasonably challenge well known statements and statements based on personal knowledge when they are made by the Board of Patent Appeals and Interferences. In re Selmi, 156 F.2d

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96, 70 USPQ 197 (CCPA 1946); In re Fischer, 125 F.2d 725, 52 USPQ 473 (CCPA 1942). See also In re Boon, 439 F.2d 724, 169 USPQ 231 (CCPA 1971) (a challenge to the taking of judicial notice must contain adequate information or argument to create on its face a reasonable doubt regarding the circumstances justifying the judicial notice). If applicant does not seasonably traverse the well-known statement during examination, then the object of the well known statement is taken to be admitted prior art. In re Chevenard, 139 F.2d 71, 60 USPQ 239 (CCPA 1943). A seasonable challenge constitutes a demand for evidence made as soon as practicable during prosecution. Thus, applicant is charged with rebutting the well-known statement in the next reply after the Office action in which the well known statement was made.

As to claims 1 and 5, Venkatesh et al does not expressly disclose first collimating and then focusing the test signal. Knuttel discloses, in figure 1, lens 14 for collimating the beam and lens 15 for focusing the beam onto object 18. It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the single lens 27 in Vakatesh et al with the lens arrangement 14,15 in Knuttel for the purpose of collimating and refocusing light from a fiber an onto an object.

As to claim 9, Venkatesh et al does not expressly disclose a 50:50 beam splitter. The beam splitting ratio can be adjusted to a variety of numbers (90:10, 50:50, etc.) to suit the particular application. In this case, the desire is to achieve equal intensity beams. It would have been obvious to one of ordinary skill in the art at the time of the invention to make design coupler 16 to be a 50:50 beam splitter in figure 1 of Venkatesh et al for the purpose of obtaining equal intensity signals in the 2 output arms, since it

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has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)..

As to claim 11, Venkatesh et al discloses a continuum wave laser source—low coherence source 12 in figure 1 is a light emitting diode (column 4, lines 4-5).

As to claims 12, Venkatesh et al discloses an optical cavity created by reflectors 25 and 26, and the thin film 15 (optically transparent object) is disposed between the two reflectors.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Venkatesh et al (USPN 5,633,712) and Knuttel (DE 102-07-186.1), as applied to claim 1 above, and further in view of Massig et al (Applied Optics vol. 40, No. 13, p 2081 -2088).

As to claim 2, the applicant further claims measuring the thickness, filtering peaks in the FFT and applying the inverse FFT. Venkatesh et al discloses measuring the thickness of the thin film 15 (see title). Venkatesh et al does not expressly disclose filtering peaks of the FFT and computing the inverse FFT. Massig et al discloses a method for filtering FFT signals to solve the problem of inaccuracies in the spectrum due to spectral leakage (see figure 1 and page 2082, column 2). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the filtering method of Massig et al on the optical spectrum in Venkatesh et al for the purpose of improving the accuracy of the thickness measurement. Massig et al further discloses applying the inverse FFT to the filter function (page 2083, column 2). Inverse FFT's can

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be transformed into a cosine or sine function – both sinusoidal functions being related in phase. It would have been obvious to one of ordinary skill in the art at the time of the invention to compute the inverse FFT on the spectrum of Venkatesh et al for the purpose of creating a smoother filter function.

Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Venkatesh et al (USPN 5,633,712), and Knuttel (DE 102-07-186.1), as applied to claim 1 above, and further in view of Wang et al (USPN 6,961,123).

As to claims 3 and 4, the applicant claims a polarizer element, a polarization beam splitter. Venkatesh et al does not expressly disclose a polarizer element. Wang et al discloses a polarizer element (polarization beam splitter 51 in figure1). Combining polarization sensitive data with OCT data can reveal additional information about an object under investigation (column 1, lines 23 – 32). It would have been obvious to one of ordinary skill in the art at the time of the invention to include a polarizer element from Wang et al in the path of the reflected light from the thin film in Venkatesh et al for the purpose of achieving improved resolution and/or acquiring additional information about the object.

Further as to claim 4, the applicant claims a second spectrometer. Venkatesh et al does not expressly disclose a second spectrometer. One spectrometer has been used to collect light reflected from the object. With 2 polarization states, a separate spectrometer would be needed to collect light with the 2nd polarization state. It would have been obvious to one having ordinary skill in the art at the time of the invention to

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include an additional spectrometer in the invention of Venkatesh et al, Knuttel, and Wang et al for the purpose of collecting an additional signal of different polarization, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Venkatesh et al (USPN 5,633,712), Knuttel (DE 102-07-186.1), and further in view of Nishimura et al (*IEEE Journal of Selected Topics in Quantum Electronics*; Septeber/October 1999; Vol. 5; No. 5; pp. 1260-1265).

As to claims 6, 7, and 8, Venkatesh et al and Knuttel do not expressly disclose an in-fiber beam expander, a fiber tip collimator, or an in-fiber lensing element. Nishimura et al discloses fiber tip collimators, in-fiber beam expanders, and in-fiber lensing elements (p. 1260, left column paragraphs 1 and 2). It would have been obvious to one of ordinary skill in the art at the time of the invention to include a beam expander at the output of output arm 14 in figure 1 of Venkatesh et al for the purpose of expanding the mode spot size. Regarding claims 7 and 8, it would have been obvious to one of ordinary skill in the art at the time of the invention to include a fiber tip collimator or in-fiber lensing element at the output of output arm 14 in figure 1 of Venkatesh et al for the purpose of increasing coupling efficiency or reducing beam divergence.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Venkatesh et al (USPN 5,633,712), Knuttel (DE 102-07-186.1), and Nishimura et al

(IEEE Journal of Selected Topics in Quantum Electronics; September/October 1999; Vol. 5; No. 5; pp. 1260-1265), as applied to claim 8 above, and further in view of Jauncey et al (Optics Letters; March 1997; Vol. 12, No. 3, p. 164-165)

As to claim 10, Venkatesh et al does not expressly disclose an Er-doped fiber lightwave source. Jauncey et al discloses an Erbium-doped fiber laser source. A variety of laser sources are used based on individual applications. Er-doped fiber lasers are useful for providing short pulses at high peak powers. It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the low coherence source 12 in figure 1 of Venkatesh et al with the Erbium-doped laser of Jauncey et al for the purpose of generating high peak powers and low losses.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Venkatesh et al (USPN 5,633,712) and Knuttel (DE 102-07-186.1), as applied to claim 1 above, and further in view of Jacobson et al (USPN 6,661,502).

As to claim 13, Venkatesh et al does not expressly disclose that the optically transparent object is an optical fiber. Jakobsen et al discloses a fiber 14 in figures 1 and 2). It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the thin film 15 in figure 1 of Venkatesh et al with the fiber 14 in figure 1 of Jakobsen et al for the purpose of measuring a different object.

Claims 14, 19, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Venkatesh et al (USPN 5,633,712) and further in view of Jakbson et al (USPN 6,661,502).

As to claim 14, the features that the applicant claims are contained within claim 1, except for illuminating the fiber in a perpendicular direction. Venkatesh et al does not expressly disclose illuminating the fiber in a perpendicular direction. Jakobsen et al discloses a method and apparatus for measuring diameter of an optical fiber. It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the thin film 15 in figure 1 of Venkatesh et al with the fiber of Jakobsen et al and illuminate it in a perpendicular direction for the purpose of achieving reflected light in a specified direction.

As to claim 19, Venkatesh does not disclose multiple coating layers. Jakobsen et al discloses a secondary and primary coating layer in figure 2 for fiber 20. It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the thin film in Venkatesh with a multi-coated fiber for the purpose of measuring additional layers. It is further reiterated that the optical spectrum analyzer of Venkatesh et al generates a spectrum that in figures 2 and 3 which show the peaks that are directly correlated with the object interfaces (i.e., for determining object thickness). Adding multiple layers generates additional peaks in the spectrum.

As to claim 23, Venkatesh et al discloses an optical cavity created by reflectors 25 and 26 in figure 1, and the thin film disposed between the reflectors. It would have been obvious to one of ordinary skill in the art at the time of the invention to replace

(between reflectors 25 and 26) the thin film 15 of Venkatesh et al with the fiber of Jakobsen et al for the purpose of measuring the thickness of a different object.

Claims 15 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Venkatesh et al (USPN 5,633,712) and Jakobson et al (USPN 6,661,502), and further in view of Massig et al (Applied Optics vol. 40, No. 13, p 2081 -2088).

As to claim 15, the applicant further claims filtering peaks in the FFT and applying the inverse FFT in a cosine form. Venkatesh et al discloses measuring the thickness of the thin film 15 (see title). Venkatesh et al does not expressly disclose filtering peaks of the FFT and computing the inverse FFT. Massig et al discloses a method for filtering FFT signals to solve the problem of inaccuracies in the spectrum due to spectral leakage (see figure 1 and page 2082, column 2). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the filtering method of Massig et al on the optical spectrum in Venkatesh et al for the purpose of improving the accuracy of the thickness measurement. Massig et al further discloses applying the inverse FFT to the filter function (page 2083, column 2). Inverse FFT's can be transformed into a cosine or sine function – both sinusoidal functions being related in phase. It would have been obvious to one of ordinary skill in the art at the time of the invention to compute the inverse FFT on the spectrum of Venkatesh et al for the purpose of creating a smoother filter function.

As to claim 18, the applicant further claims recognizing unwanted peaks in the FFT. Venkatesh et al, Jakobsen et al and Massig et al do not expressly disclose

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recognizing unwanted peaks in the FFT. However, the purpose for filtering is to get rid of unwanted peaks, as explained in Massig et al (page 2081, right column, lines 24-27), and those unwanted peaks exist and contribute to the inaccuracies in the signal. It would have been obvious to one of ordinary skill in the art at the time of the invention to recognize unwanted peaks in the spectrum of Venkatesh et al using the filtering method of Massig et al for the purpose of getting rid of those peaks.

Allowable Subject Matter

Claims 16,17, and 20-22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Venkatesh et al (USPN 5,731,876) discloses a thickness measuring method using multi-layered films. This reference can be used to apply against claim 1 in similar format as done with Venkatesh et al (USPN 5,633,712).

Knuttel (USPN 5,565,986) discloses an optical spectroscopic method for depth resolved imaging. The beam splitter has four arms, but the device is free-space optics. It still reads obviously over claim 1.

Waelti (CH 05320) discloses a method for measuring optical properties that include thickness, as well as other surface characteristics. The spectral analysis does not include Fourier methods.

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Froggat et al (Optics Letters, Vol. 24, No. 14, July 15, 1999, p. 942) discloses a Fourier-transform spectrometer and discusses noise due to extraneous interference fringes and polarization dependence of measurements.

Fax/Telephone Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Denise B. Anderson whose telephone number is 571-272-8324. The examiner can normally be reached on Mon-Fri (9:30 AM - 6 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley Jr. can be reached on 571-272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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